CMC 07 RCO

AN/PVQ-31A & 31B

Introduction:

The AN/PVQ-31 is an Advanced Combat Optical Gunsight (ACOG) designed for the M16A2, M16A4, and M4 weapon systems. It provides the shooter with quick target acquisition at close combat ranges while providing enhanced target identification and hit probability out to 800 meters utilizing the **B**ullet **D**rop **C**ompensator. The AN/PVQ-31 incorporates dual-illumination technology using a combination of fiber optics and self-luminous tritium. This allows the aiming point to be always illuminated without the use of batteries. The Tritium illuminates the aiming point in total darkness, and the fiber-optic self-adjusts reticle brightness during daylight according to ambient light conditions. This allows the operator to keep both eyes open while engaging targets and maintaining maximum situational awareness.

AN/PVQ-31A & 31B

AN/PVQ-31 Identification:

AN/PVQ-31A: To be used on and calibrated for the M16A4 Rifle
Will also be used on the M16A2 Rifle.
Comes with the necessary mounting hardware
for the M16A2 also. Optic identification is TA31RCO-A4

AN/PVQ-31B: To be used on and calibrated for the M4A1 Carbine
Optic identification is TA31RCO-M4

What if you have an M16A4 rifle and you are issued an AN/PVQ-31B?

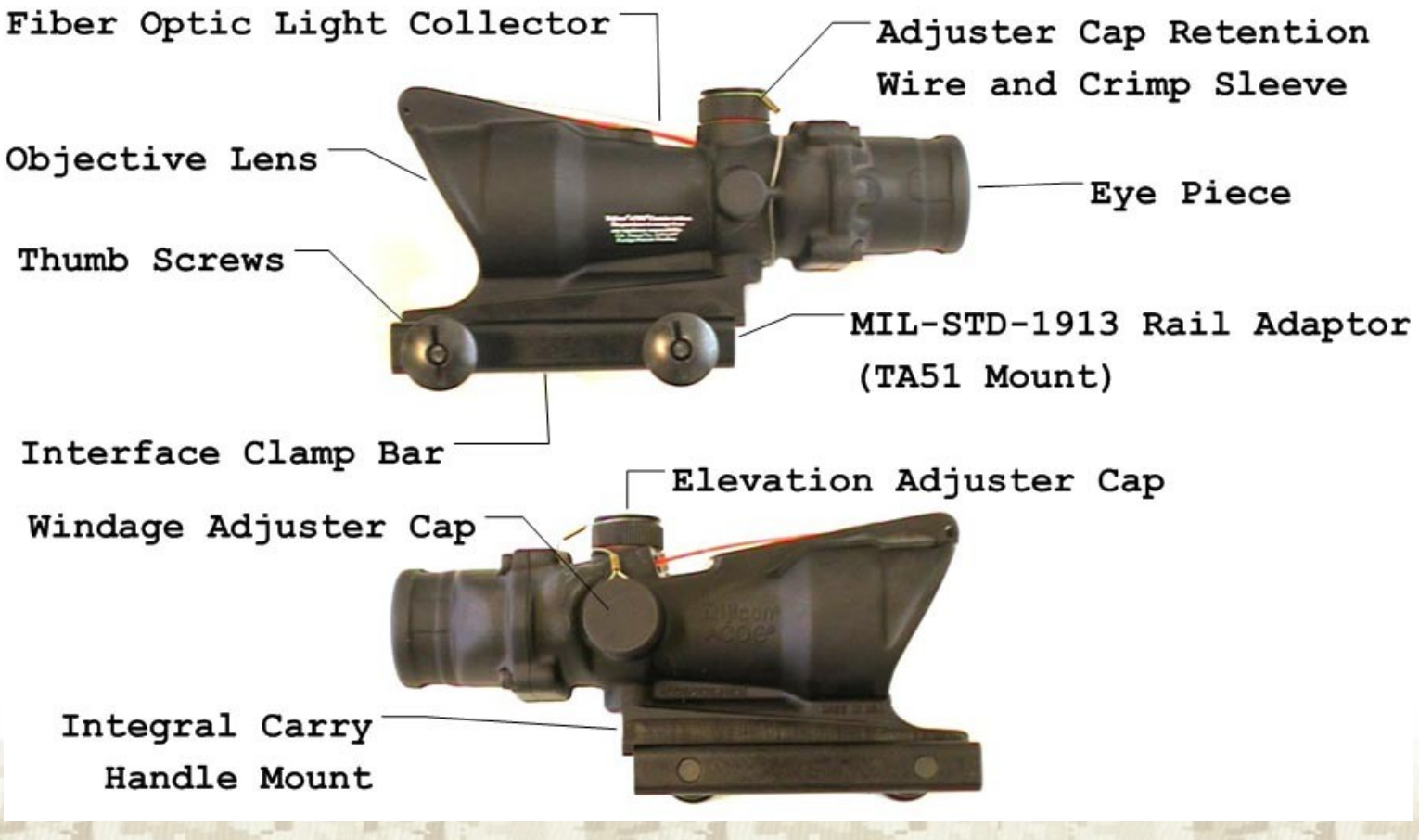
AN/PVQ-31A & 31B

Characteristics:

Objective Lens	32mm
Magnification	4 power
Eye Relief	1.5 in
Exit Pupil	8mm
Field of View	36.7 ft @ 100 yards
Length	5.8 in
Weight	15.3 oz w/ mount
Waterproof	66 ft
Tritium	0.1 curies (less than a Rolex) Useful up to 15 years.

AN/PVQ-31A & 31B

Controls & Indicators:



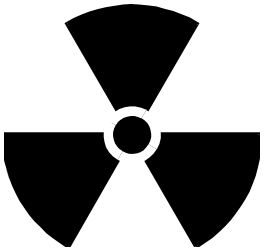
AN/PVQ-31A & 31B

Controls & Indicators:

AN/PVQ-31A & 31B

Introduction:

WARNINGS



RADIOACTIVE MATERIALS
RADITATION HAZARD
SAFETY PRECAUTIONS

The TA31RCO contains radioactive material for nighttime illumination. The radiation source is Hydrogen-3, commonly known as Tritium. Tritium is an odorless, tasteless, colorless gas that reacts to the human body in the same manner as natural hydrogen. The human body does not easily retain hydrogen or Tritium as a gas. However, the oxide, HTO, which is formed by the burning of Tritium, is 10,000 times more hazardous. For this reason great care should be taken to avoid flame in the presence of the TA31RCO with a Tritium lamp which is broken or is suspected of leaking. The TA31RCO is regulated under an EXEMPT LICENSE from the United States Nuclear Regulatory Commission (NRC) held by Trijicon, Inc. Disassembly of the scope is prohibited except by Trijicon, Inc.

If you identify a breached RCO, contact your Radiological Safety Officer

AN/PVQ-31A & 31B Maintenance

Do Not:

1. Use any type of solvent on the AN/PVQ-31
2. Use any type of tools in an attempt to “break down” the AN/PVQ-31
3. Do anything other than use water, soap, and/or the Lens Pen to maintain the AN/PVQ-31.

AN/PVQ-31A & 31B Maintenance

Cleaning the AN/PVQ-31

To clean the AN/PVQ-31it is recommended that clean water be used to rinse foreign material from the external surfaces and lenses. Soapy water is better but, rarely available in the field.

If water is unavailable, the AN/PVQ-31 comes with a cleaning tool (Lens Pen) that does not require the use of

AN/PVQ-31A & 31B Maintenance

To clean the AN/PVQ-31 utilizing the Lens Pen, first depress and push forward the Lens brush slider, exposing the Lens brush. Use this brush to remove all foreign material from the unit if fresh water is not available.
Pay special attention to the lenses. ALL foreign material must be removed before continuing.

Next, remove the cap from the opposite end of the Lens Pen to expose the Felt Lens Cleaner. Ensure there is NO foreign material on the felt surface. Starting in the center of the lens, press the felt surface of the lens cleaner against the lens and in a spiral motion, work from the center to the outside edge of the lens. Repeat if necessary.

When finished, depress Lens Brush Slider and retract the brush into the Len Pen. Replace the cap over the Felt Lens Cleaner.

AN/PVQ-31A & 31B

AN/PVQ-31 Inspection:

It is recommended that the Tritium lamp be checked prior to deployment of the optic and every six months or immediately following any incident which might lead to lamp failure such as the dropping of the AN/PVQ-31 onto a hard surface.

To determine that the Tritium lamp is functioning in the AN/PVQ-31 enter a dark room and look through the optic. The Chevron should be illuminated red. The illumination provided by the tritium lamp is very faint and will be hard to see without a dark-adapted eye. Remain in the dark room for approximately ten minutes to adapt your eyes to the dark. The reticle is illuminated in low light or complete darkness. If the reticle does not appear to illuminate in the dark, contact your unit maintainer for confirmation and disposal.

AN/PVQ-31A & 31B

AN/PVQ-31 Inspection, con't. Older mod

Small bubbles or milky lines are acceptable and will not alter the performance of the optic

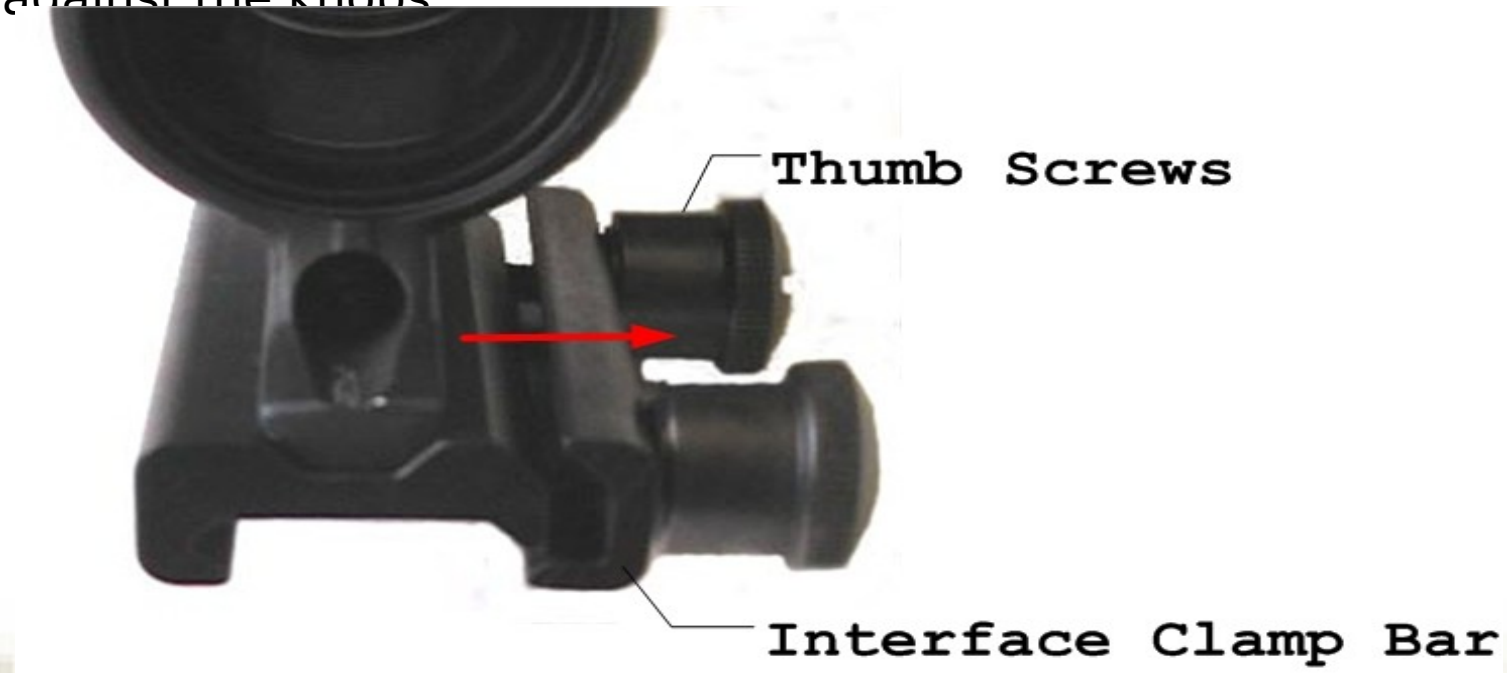
Trace amounts of silicone may be visible and are considered normal. This will not affect the performance of the optic

AN/PVQ-31A & 31B

AN/PVQ-31 Installation:

Rail

The AN/PVQ-31 is easily attached to the M16A4/M4 flattop receiver rail. Prior to attempting to mount the optic, loosen the thumb screws and pull the interface clamp bar back against the knobs.

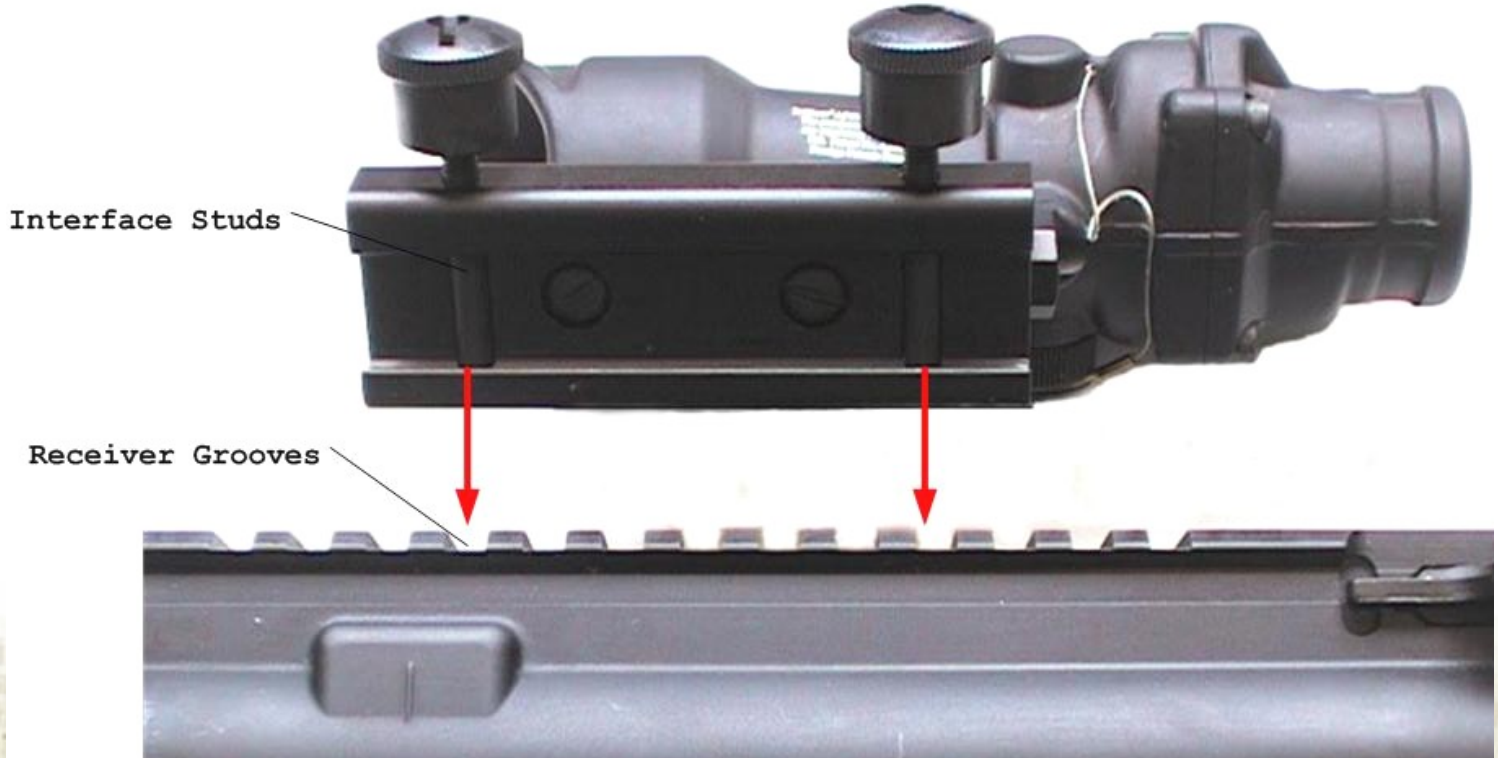


AN/PVQ-31A & 31B

AN/PVQ-31 Installation:

Rail

Place the AN/PVQ-31 onto the flattop receiver rail. Be sure to align the interface stubs located on the bottom of the adapter with the grooves on the rail of the flattop receiver.



AN/PVQ-31A & 31B

AN/PVQ-31 Installation:

Rail

The AN/PVQ-31 can be placed in any of the slots on top of the receiver to allow for eye relief adjustment. Once the ideal position has been determined, apply forward pressure on the optic and tighten the knobs using finger pressure only. Then, add another ¼ turn utilizing a coin or bladed screwdriver.

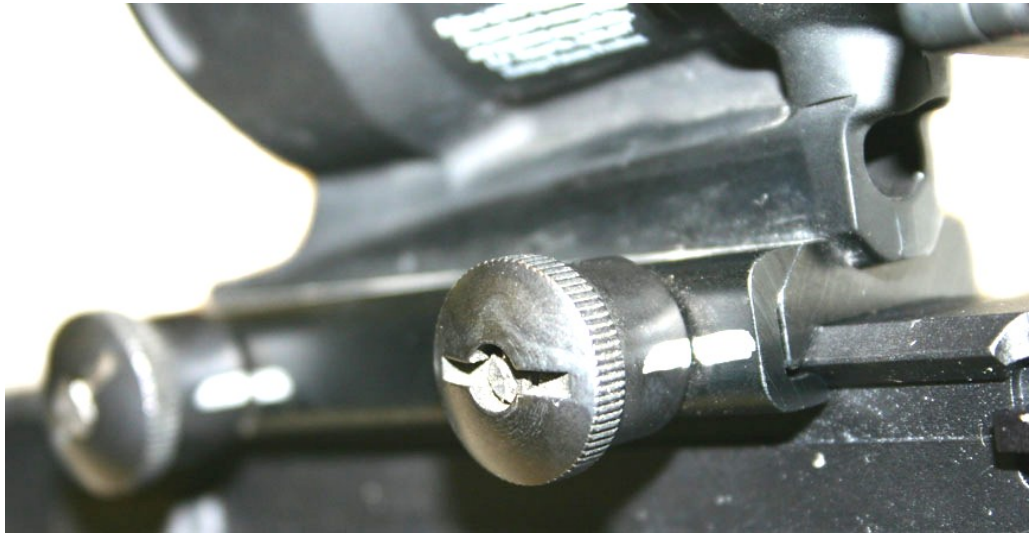
Caution: DO NOT tighten beyond this recommended method.

AN/PVQ-31A & 31B

AN/PVQ-31 Installation:

Rail

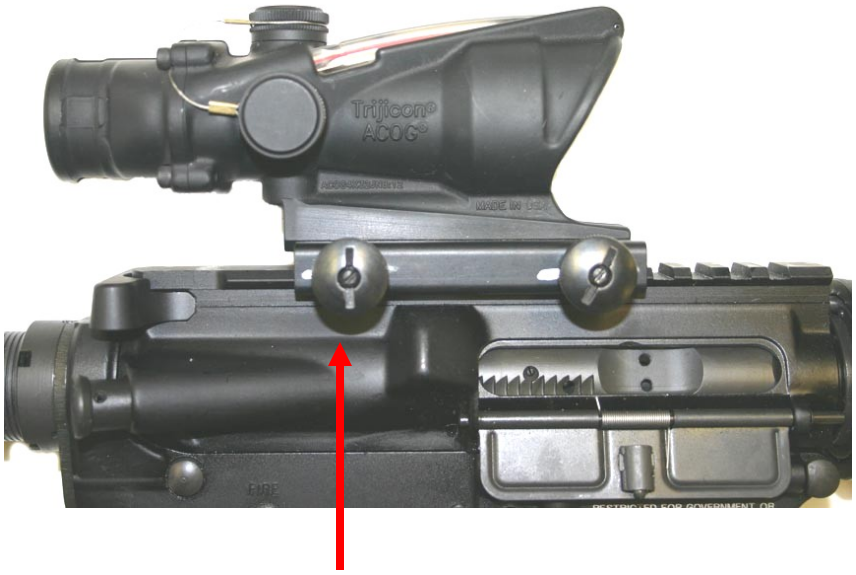
Installing the AN/PVQ-31 in the same position on the flattop rail and using the same torque on the thumb screws will ensure maximum zero retention.



Mark the Thumb Screw location with permanent marker or other means.

AN/PVQ-31A & 31B

AN/PVQ-31 Installation: Rail (reversed to prevent thumb screws snagging on Molle Gear



Remove and reverse the TA51 Mount putting the Thumb Screws on the right side.

No obstructions on the left side to snag on Molle Gear

AN/PVQ-31A & 31B

AN/PVQ-31 Adjustment Procedures:

The optic is shipped in a center position for the M16A4/M4 weapons.

Normally this means that only small adjustments are necessary. **DO NOT**
adjust the optic to the extremes.

Caution: The windage and elevation adjusters should never be moved all the way to the extremes in adjustment. It is possible that over-adjustment will damage the precise alignment of the prism assembly inside the AN/PVQ-31. If the adjuster resistance increases, the limits of travel are being approached. Adjust further only with caution. As the limits of the adjustment are reached, the adjustment mechanism will become more and more difficult to adjust. If the adjustment mechanism is adjusted past this point, it will break. If it seems you need more adjustment that is

AN/PVQ-31A & 31B Technical

AN/PVQ-31 Adjustment Procedures: ELEVATION

Remove the **top** adjuster cap to expose the elevation adjuster. Moving the adjuster in the direction of the arrow (clockwise) will move the strike of the bullet **UP** as indicated on the adjuster. Tap the adjuster after making each adjustment.

Adjustment increments are 1/3 inch per click at 100 meters. This means that 3 clicks are required to move the bullet impact one inch on a target at 100 meters. At 36 yards 9 clicks are required to move the bullet impact one inch.

AN/PVQ-31A & 31B Technical

AN/PVQ-31 Adjustment Procedures: WINDAGE

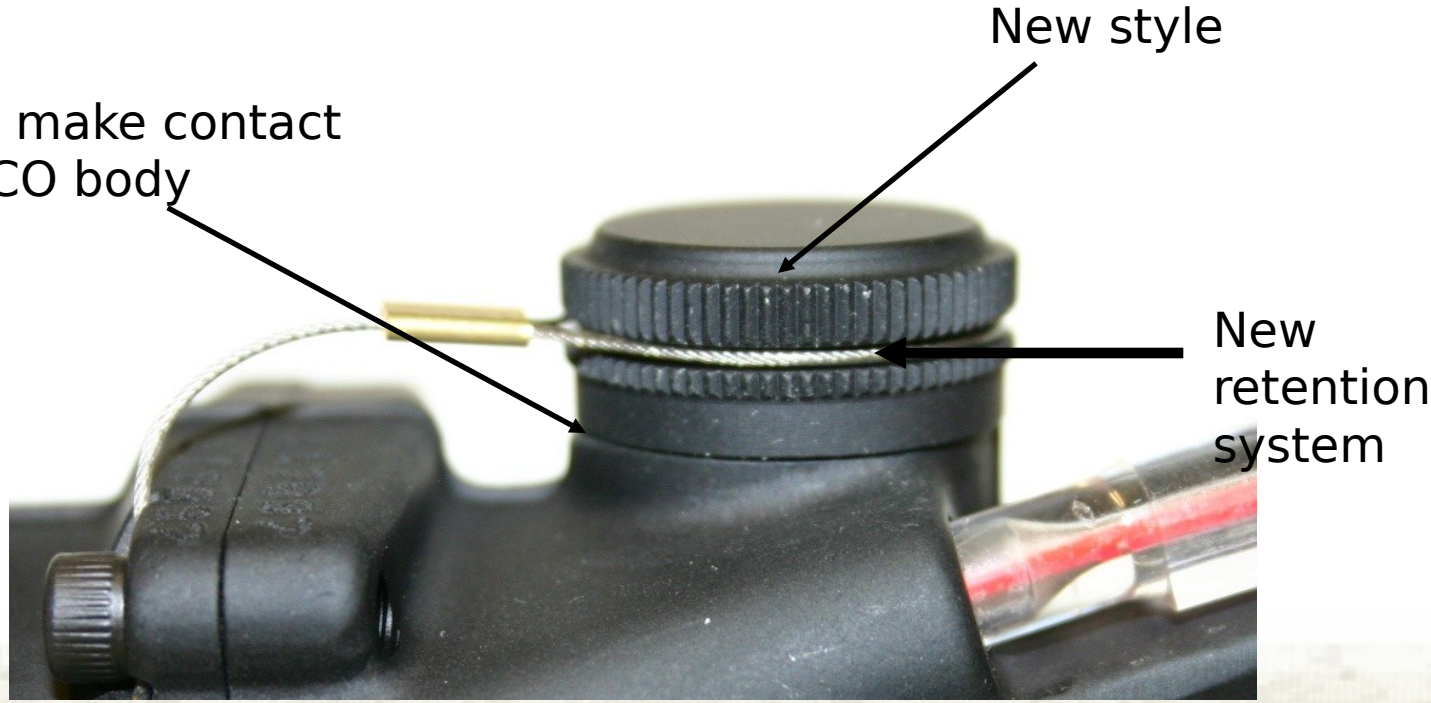
Remove the **side** adjuster cap to expose the windage adjuster. Moving the adjuster in the direction of the arrow (clockwise) will move the strike of the bullet **RIGHT** as indicated on the adjuster. Tap the adjuster after making each adjustment.

Adjustment increments are 1/3 inch per click at 100 meters. This means that 3 clicks are required to move the bullet impact one inch on a target at 100 meters. At 36 yards 9 clicks are required to move the bullet impact one inch.

AN/PVQ-31A & 31B Technical

AN/PVQ-31 Adjusters: New style

New adjuster caps provide more rugged protection and better retention.



AN/PVQ-31A & 31B
Field Craft

Improvised adjustable reticle illumination

AN/PVQ-31A & 31B
Field Craft

Improvised adjustable reticle illumination

Transitional light periods

AN/PVQ-31A & 31B

AN/PVQ-31 Reticle Pattern

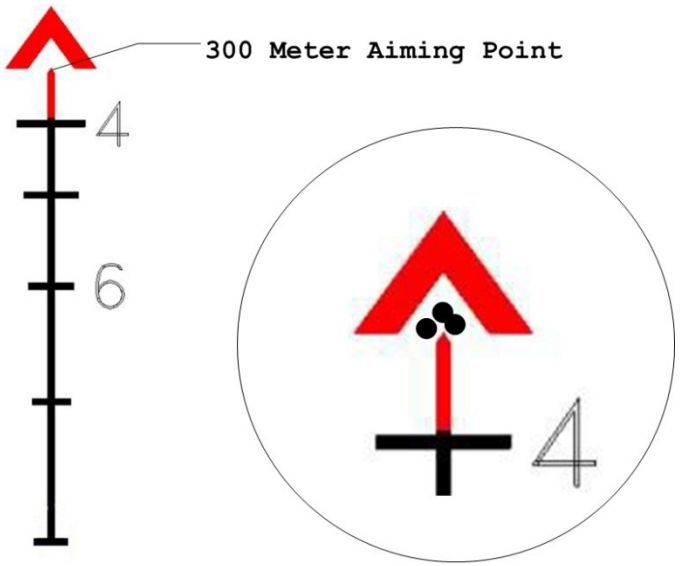
Reticle Pattern: Consists of a red chevron, horizontal stadia lines, and left and right horizontal mil scale.

The AN/PVQ-31 reticle includes a horizontal mil-scale graduated in 5 mil increments. The distance from the tip of the chevron to the first mil scale left and right is 10 mils.

The horizontal mil scale is primarily used for communicating target positions and other relationships to team members within the fire team.

AN/PVQ-31A & 31B Technical

AN/PVQ-31 Zeroing at 36 yards –Battle Sight Zero (BZO):



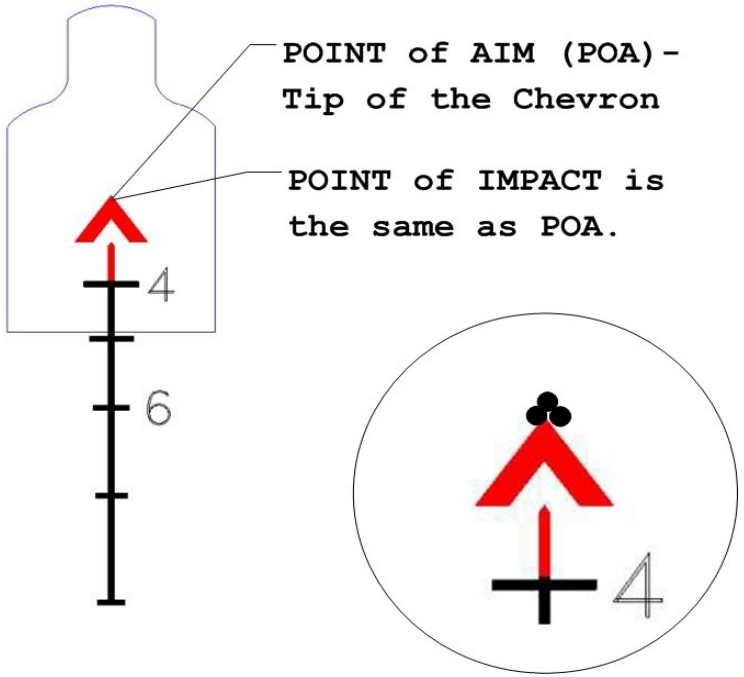
9 clicks = 1 inch

To acquire a Battle Sight Zero for the AN/PVQ-31 at 36 yards(30 meters), use the **tip of the 300 meter aiming point** to acquire Point of Aim/Point of Impact.

NOTE: This is a BZO only. Confirm zero at 100 meters as soon as

AN/PVQ-31A & 31B Technical

AN/PVQ-31 Zeroing at 100m -(preferred method):



3 clicks = 1 inch

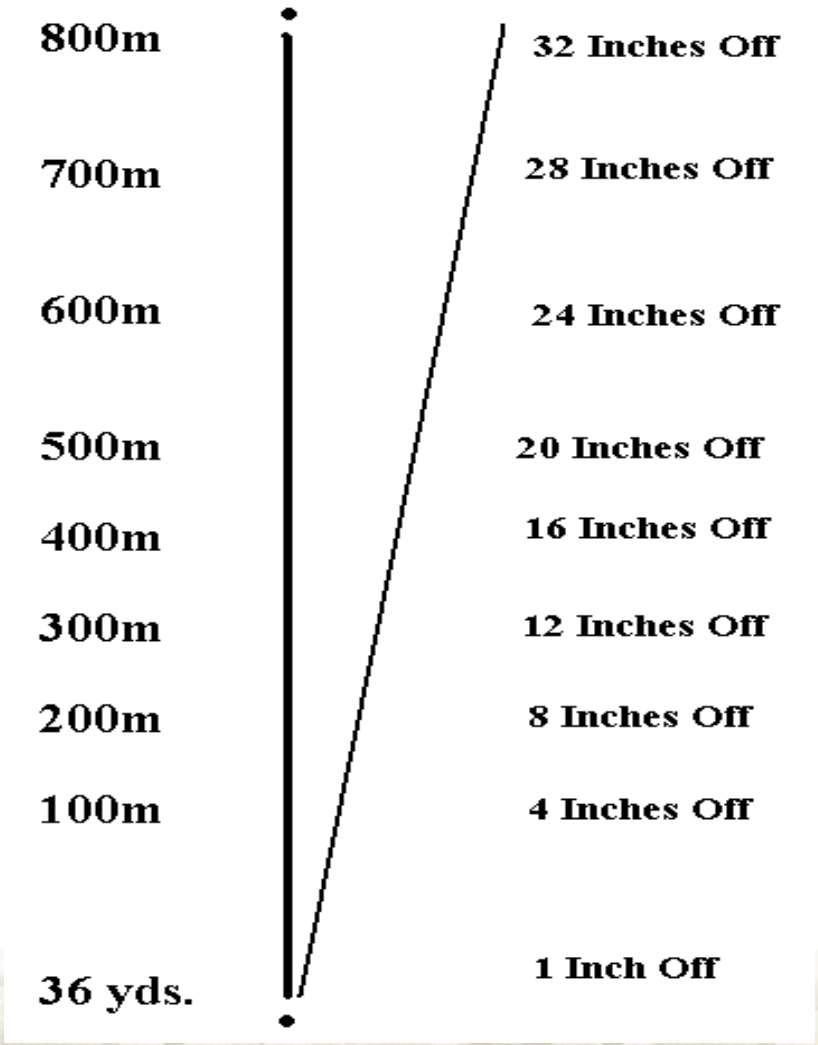
When zeroing the AN/PVQ-31 at 100 meters, the **tip of illuminated chevron** is used to acquire the Point of Aim/Point of Impact. This method ensures maximum accuracy out to 800 meters utilizing the Bullet Drop Compensator.

AN/PVQ-31A & 31B Technical

AN/PVQ-31 Improper Zero:

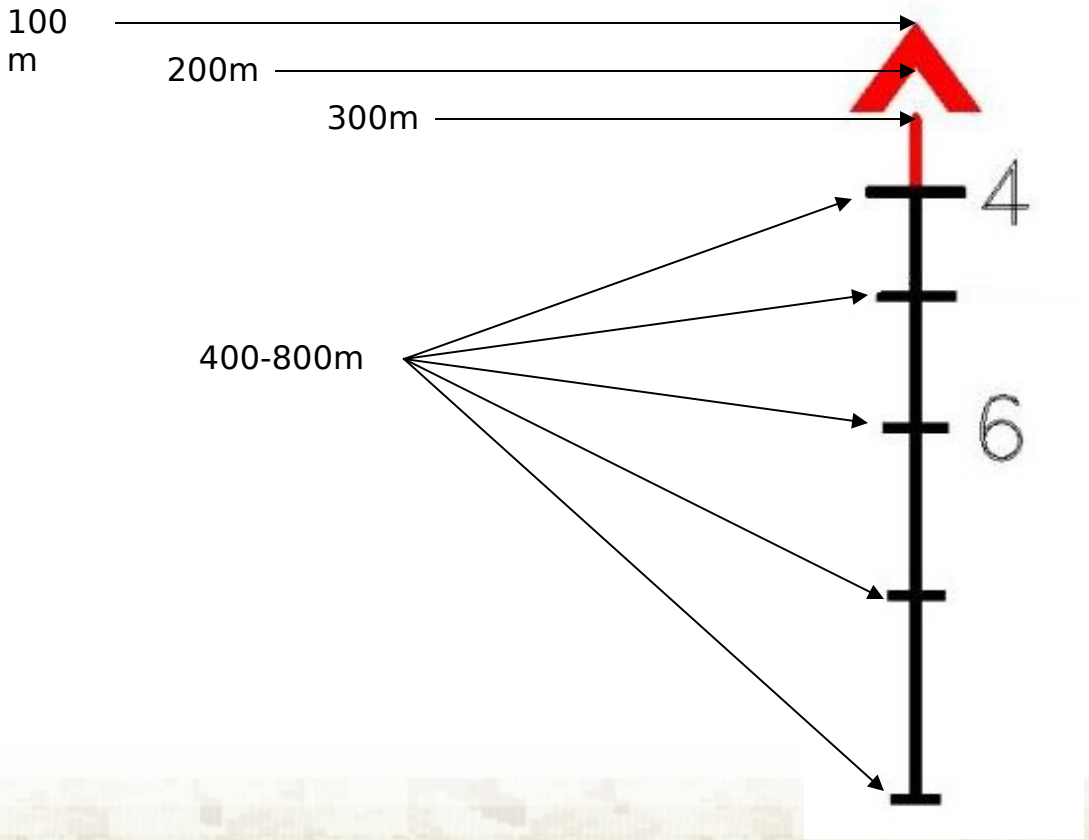
It is extremely important to acquire an accurate zero. These margins of error based on an incorrect zero of 1 inch does not take into consideration:

- Weapon inaccuracies
- Ammunition inaccuracies
- Human error
- Environmental conditions



AN/PVQ-31A & 31B Technical

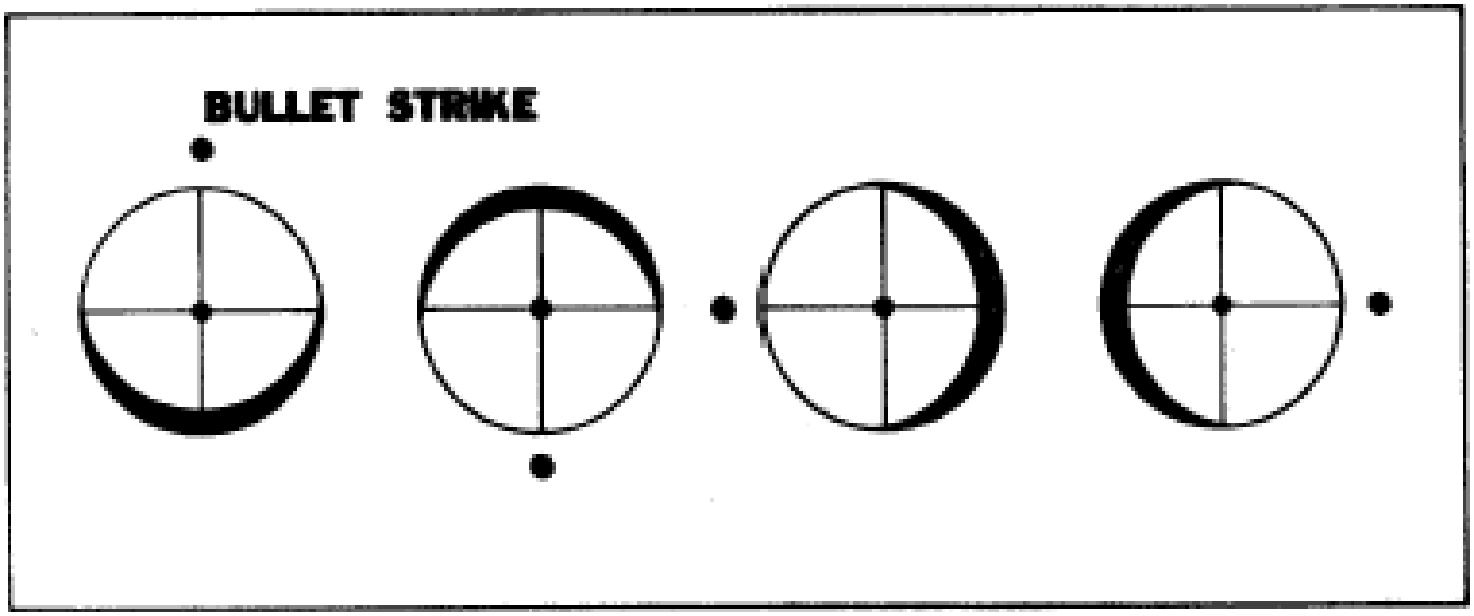
AN/PVQ-31 Bullet Drop Compensator (BDC) Points of Impact:



AN/PVQ-31A & 31B Application

Shooting 400-800m: (Traditional Marksmanship skills)

3. Ensure you have a FULL field of view with no shadow. Improper eye relief, or sight alignment will cause scope shadow. This will result in improper shot placement.



AN/PVQ-31A & 31B Application

Determining your Dominate Eye:

To maximize the AN/PVQ-31's potential you must know which of your eyes is dominate. To determine this do the following:

1. With both eyes open, hold your index finger out in front of your line of sight.
2. Pick up an aiming point and keep your index finger on it.
3. Close your right eye. If your finger/aiming point move, you are right eye dominate. If your finger/aiming point did not move, you are left eye dominate.

To use any aiming device (optic) to it's maximum potential you must use your dominate eye. This may mean learning to shoot from your opposite side.

AN/PVQ-31A & 31B Application

Shooting 400-800m: (Traditional Marksmanship skills)

Environmental effects on impact:

Lights UP- Sights UP

Lights DOWN- Sights DOWN

Lights RIGHT- Sights LEFT

Lights LEFT- Sights RIGHT

Temperature goes UP- Impact goes UP

Temperature goes DOWN- Impact goes DOWN

Rule: 1 MOA for every 20 degrees

AN/PVQ-31A & 31B Application

Shooting 400-800m: (Traditional Marksmanship skills)

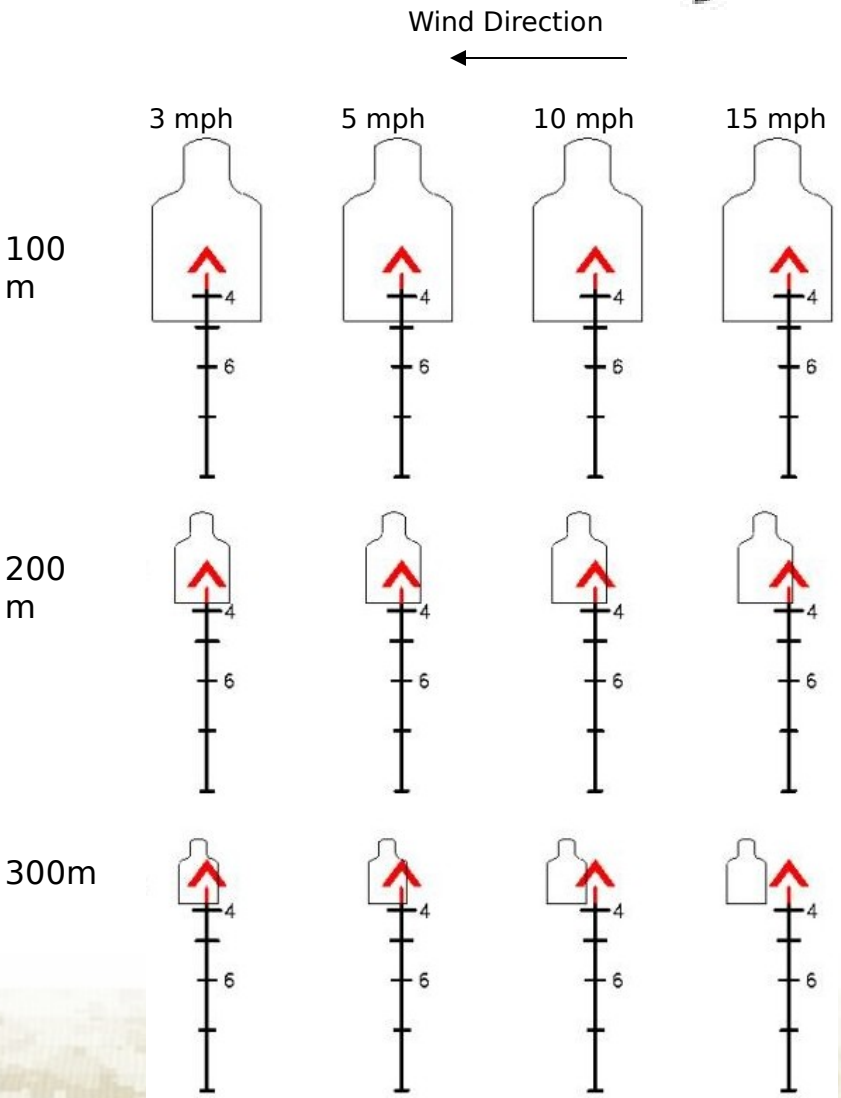
DO NOT apply pressure to the sling when using the M16A2, M16A4, or M4A1 Carbine with an RCO while using traditional marksmanship skills OR when you need precise Point of Impact at closer ranges.

- The RCO (optic) is attached to the receiver unlike the front sight of the barrel. When the barrel is flexed (sling pressure) the RCO remains zeroed to a straight barrel causing major shifts in impact at medium to long distances.

AN/PVQ-31A & 31B Application

Shooting with wind:

Wind will have a significant affect on the 5.56mm round's POI beyond 100 meters. Aim into the direction of the wind and watch for impacts. Adjust accordingly.

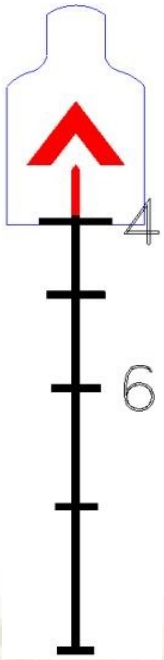


RCO-TABLE 2

AN/PVQ-31A & 31B Technical

AN/PVQ-31 Ranging Capability:

For quick target acquisition at 300m or less, place the illuminated chevron aiming point on a high center chest hold. Proper shooting techniques to aid in quick target acquisition are covered under applications.



AN/PVQ-31A & 31B Application

BOTH eyes 'OPEN' shooting: 0-300 meters (Snap Shooting)

The AN/PVQ-31 is designed to be used with BOTH eyes OPEN from muzzle to 300m for quick target acquisition and engagement. This allows the AN/PVQ-31 to be utilized as a reflexive sight when SPEED is CRITICAL at these distances. Train yourself to:

1. Keep BOTH eyes OPEN
2. Focus on your target
3. Bring the weapon/optic up into your line of sight
    - DO NOT switch focus to the reticle
4. Access and /or Engage when warranted.

AN/PVQ-31A & 31B Application

BOTH eyes 'OPEN' shooting: 0-300 meters (Snap Shooting)

Distance, situation, and skill will dictate how fast you engage your target.

- At extreme close ranges where time is critical to survival, put RED on TARGET and engage.
  - *Hammer Pairs* (Priority is speed over accuracy)
- At close ranges where time is still critical, but distance will require a slight degree of accuracy, SEE the red chevron on target and engage.
  - *Controlled Pairs* (Priority is accuracy and speed)
  - Failure Drill (A pair to the chest does not create the desired results so (1) round to the head follows.
  - Non-standard Response (Continue to shoot until you get the desired results)

AN/PVQ-31A & 31B Application

Both eyes "OPEN' shooting: Bindon Aiming Concept (BAC)

The BAC feature allows the shooter to track and engage multiple and / or moving targets quickly.

Utilizing the BOTH eyes OPEN aiming method, when the weapon is being moved, the image as seen through the AN/PVQ-31 with your shooting eye blurs much quicker than the view from your non-shooting eye (because it's magnified 4x). So, the brain chooses the non-blurry view from the non-shooting eye automatically (switches focus). As soon as you are close to the proper aim on target, you slow the weapon movement, the blur ceases, and your brain instantly selects the greater detail of the magnified view.

What this means is, when the weapon is moving to target you will not notice any magnification. All you will see is the illuminated chevron in the target area, like a reflexive sight. Once you slow the weapon on target, the target will 'Zoom' in 4x, allowing you identify and engage more accurately if necessary.

This aiming concept happens naturally (without conscious thought) for those with equal or close to equal vision in both eyes. It takes practice

AN/PVQ-31A & 31B Application

Transitional Shooting:

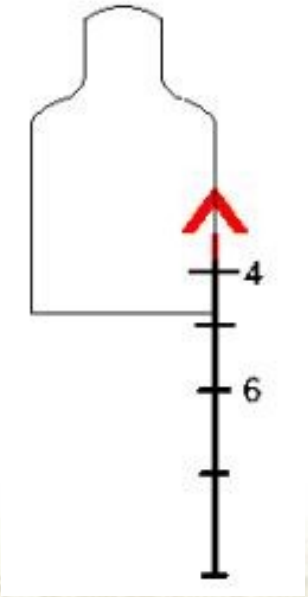
Transitional shooting is utilized when the shooter must engage targets at varying distances (based on actual or perceived threat) within a short period of time. This will require the shooter to transition from Speed to Controlled Hits, and Traditional Marksmanship quickly and effectively. A mental transition must be made from speed vs. accuracy and vise versa as target priorities change.

What determines target priorities?

AN/PVQ-31A & 31B Application

Shooting at moving targets: Close (under 50m)

Shooting a moving target at close range requires the shooter to keep BOTH eyes open (BAC) and ‘track’ the target from behind until the chevron is at the leading edge of the torso. Continue to maintain that lead as you squeeze the trigger. Repeat if necessary!



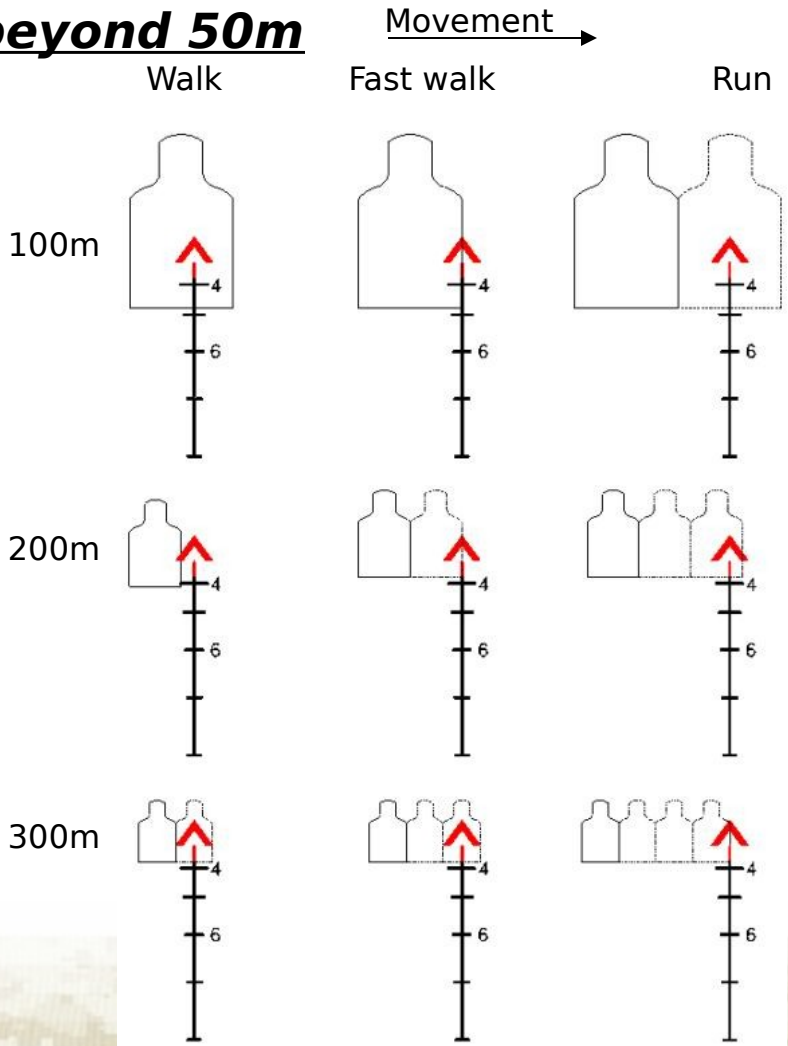
AN/PVQ-31A & 31B Application

Shooting at moving targets: beyond 50m

Utilize the same lead concept as in iron sight shooting.

Lead your target considering the following:

- Speed of target
- Angle of target movement
- Range to target
- Wind effects



IN CONCLUSION!

1. Mount it correctly
2. ZERO it correctly
3. Keep BOTH eyes OPEN from muzzle to 300 meters for QTA
4. Know the BDC
5. Know and apply Traditional Marksmanship Skills beyond 300 meters
6. TRAIN

Keys to Success with the AN/PVQ-31 RCO!